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ABSTRACT

Despite long-standing provisions in three Philippine constitutions naming Filipino as the national language, there has been no serious effort to implement the use of Pilipino in the Philippine educational system. Pilipino is based mainly on Tagalog, but is also a blend of words taken from English, Spanish, Arabic, Tamil, and Chinese. A 1973 bilingual policy allowed teachers to use Pilipino in social science subjects and English in science and mathematics subjects due to the difficulty of translating some technical terms. Bilingual education was defined as the separate use of Pilipino and English as media of instruction in definite subjects and the use of the vernacular of the locality as the auxiliary medium of instruction. Implementation of this policy seems to have resulted in the deterioration of achievement results in English, science, and mathematics. Proponents of teaching science in English cite three major reasons for its continued use: it is tested and viable, it is economical, and it is universal. Opponents suggest that science can be taught effectively using the native language and that using English as the language of instruction benefits only the elite. Several studies are cited that are not conclusive but that suggest the difficulty in formulating a single educational policy flexible enough for a country like the Philippines where the vernacular seems to influence the learning of subjects like science. It is concluded that the first language of children is necessary for learning science. Contains 10 references. (LB)

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PILIPINO OR ENGLISH IN SCIENCE LEARNING?

THE CASE OF BILINGUAL EDUCATION IN THE PHILIPPINES

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ENGLISH OR PILIPINO IN SCIENCE LEARNING?

THE CASE OF BILINGUAL EDUCATION IN THE PHILIPPINES

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Introduction

Despite long standing provisions in three Philippine Constitutions naming Filipino as the national language, there has been no real serious effort to implement the use of Filipino in the Philippine educational system. Filipino is based mainly on Tagalog, one of the 70 dialects spoken in areas around Central Luzon and Manila. Filipino, however, is a blend of words taken from languages such as English, Spanish, Arabic, Tamil and Chinese - languages rooted from the various colonising countries who made their impact on Philippine culture and tradition.

In 1973, the Ministry of Education adopted a bilingual policy that allowed teachers to use Pilipino in social science subjects and English in science and mathematics subjects because of the difficulty in translating some scientific technical terms. Bilingual education was defined as the separate use of Pilipino and English as

media of instruction in definite subjects and the use of the vernacular of the locality as the auxiliary medium of instruction. In this implementation of bilingual education, pupils in Grades 1 and 2 are taught using the vernacular of the locality plus Pilipino and English as separate language subjects. From Grade 3 onwards, Social Studies, Character Education, Work Education, Music, Arts and Physical Education are taught in Pilipino with Pilipino and English subjects continuing to be taught as separate subject languages.

The implementation of this policy in the educational system appeared to have resulted in the deterioration of achievement results in English, Science and Mathematics. In 1983, the Bureau of Secondary Education evaluated the achievement of fourth year students in all the major subjects and found that all subject areas except Pilipino had a national mean of below 50 percent. English had a national mean of 43.8%. Science 36.4%, Mathematics 43.4%, Social Studies 40.5% and Pilipino 53.0%. The achievement results seem to be even more alarming in rural government schools and in regions where Pilipino is not the mother tongue. In 1985 the Science Education Development Plan (SEDP) reported that "there seems to be agreement that the

child learns faster in a language familiar to him and that a foreign language limits and even deters learning".

Pilipino or English?

Proponents of teaching science in English language cite three major reasons for its continued use in the Philippine educational system: the use of English is tested and viable; it is economical; and it is universal (Quirino, 1983). As regards to its viability and testability, it is claimed that English as a medium of instruction in the school curriculum has produced thousands of highly competent graduates who are now very well placed in various sectors of the country. It is an acceptable and a reliable system for learning science in the world. For economical reasons, a change to Pilipino would mean an upheaval in the system. Research and years of study not to mention the huge amount of financial inputs are needed to undertake the task of translating science books and research journals mostly written in English into Pilipino. Besides there is also the need to translate specific science terminologies to Pilipino. Apart from translating English references and texts into Pilipino, there is

the gargantuan task of training science teachers to teach science in a language that they themselves are not very proficient in. On the issue of universality proponents maintair that English is one of the "lingua franca" of the world used especially in science and technology. It is the medium used to publish, document and disseminate research reports in science books and scientific journals. It is the major language used at international seminars and conferences. It is a global language.

In spite of the generally accepted advantages of using English in teaching science other educators have expressed serious doubts on using English in the country. Along with the SEDP report, these educators feel that science can be taught effectively using the native language than in a foreign language. The reasons for using English to teach science based on the reasons proposed by English proponents are challenged. It has been argued that it is not the lack of terminology or instructional materials that will hinder the learning of science in Pilipino, but it is using the materials in a foreign language that will deter the learning of the science concepts. This is aggravated by having

science teachers who are inadequate in understanding and expressing the language because they themselves do not have the necessary cognitive skills to read and understand the science concepts written in a foreign language. Expecting the teachers to teach science effectively in a foreign language further aggravates the problem. The majority of the students is therefore unable to learn science and assimilate it in their culture simply because they are like most of their teachers handicapped by the use of the foreign language. Shifting the medium of instruction to Pilipino will undoubtediy entail enormous expense, but proponents of Pilipino advocate that the expense of making the shift is "nothing compared to the expense of teaching in a language which benefits only the elite and cripples the masses" (Constantino, 1983). It has been estimated that only the elite Filipinos are able to acquire proficiency in English (about 15%); the remaining 85% remain illiterate in the language.

Some Research Studies

What would then be the effective medium of teaching science? If it is English, are we teaching science or the English language in our science lessons? How much

is the use of English interfering with the learning of science?

Acuna & de Guzman (1987) reported three consecutive nation-wide studies they conducted with students on language and science achievement. The studies included student samples from Luzon (Tagalog Region), Visayas and Mindanao (non-Tagalog/Regions). The first study in the Luzon area involved 475 randomly selected schools in Tagalog and non-Tagalog speaking regions. A science test was administered to Primary 5 (age 10) pupils. The science test was first administered to half of the pupil sample in a class in English followed by the same test in Pilipino. The other half of the pupil sample in the class completed the science test in Pilipino first followed by the English version of the science test. The test was equivalent in content and it was felt that the difference between the means reflected the differences in scores that can be attributed to the language used. It was found that the order in which the two tests were given was insignificantly related to the test scores. The results showed that testing in Pilipino did not necessarily put students in non-Tagalog speaking regions at a disadvantage.

The second study was conducted in Mindanao, the largest island in the country with Visayan speaking children at Grade 5. In this study, a comparison was made on the comprehension scores of English words using Words in Elementary School Science (WESS) with the comprehension scores of the national sample data. Three patterns were observed in the results. There were items that were equally difficult in Pilipino and English; items where English was more difficult than Pilipino; and items where Pilipino was more difficult than English. The results showed that there were more items where the students did better in Pilipino than in English and that for this group of students, the relational terms were better understood in Pilipino than in English.

A third study conducted in the Visayas region involved about 200 students in Grade 5. A science achievement test was administered along with instruments measuring quantitative ability, attitude and word knowledge in English. Stepwise multiple regression analysis was conducted to determine the best predictor for science achievement. The results indicated that quantitative ability was the best single predictor for science achievement followed by word knowledge in English.

In another study, a Regional Achievement Test (RAT) was administered to Grade 4 and Grade 6 pupils in Region IX, Mindanao, a non-Tagalog speaking Region for two consecutive years. The RAT test covers the learning areas of English, Science, Mathematics, Filipino, Kasaysayan/Heograpiya/Sibika, Home Economics and LIvelihood Education, Music, Arts & Physical Education. For the academic schoo: year 1989-1990 and 1990-1991, 1177 Grade 4 and 1181 Grade 6 pupils in 41 randomly selected schools participated in the testing. Table 1 and Table 2 show the achievement results in English, Science and Pilipino in Mean Percentage Scores (MPS) by school division for Grade 4 and Grade 6. The test result for Grade IV shows a decrease over the two year period in the English achievement scores for all school divisions where "Visayan" is the vernacular used in Grades 1 and 2. There is a slight increase in English scores in areas where "Chavacano", "Tausog" and "Sama" are the vernaculars used. In science achievement, a decrease is noted for two of the largest "Visayan" speaking areas (Pagadian and Zamboanga del Sur), in the two "Chavacano" speaking areas (Basilan and Zamboanga City) and the highest decrease among "Sama" speaking pupils in Tawi-Tawi.

The results also show a decrease in the mean achievement scores in Pilipino for pupils in three "Visayan" speaking areas. The test results for Grade VI appear to have a similar trend for Visayan speaking pupils. In Table 2, Dapitan City, Pagadian City and Zamboanga del Sur "Visayan" speaking pupils registered a decrease in mean achievement scores in all the three subject areas of English, Science and Pilipino over the two year period.

While the results in the studies cited are not very conclusive it becomes very difficult to formulate a single educational policy that is not flexible for a country like the Philippines where the vernacular seems to influence the learning of pupils in school subjects like science. Certainly, knowledge and understanding of science words are important and the two have been found to be related. However, students in the studies mentioned seem to relate and understand science words better in Pilipino than in a foreign language. The similarity of the "vernacular" to Pilipino also has a tremendous influence on the learning of science. In the case of "Visayan" speaking pupils, their language is very different than "Tagalog". On the other hand the "Tausog" language of the Muslims in the South has

many words that are similar to "Tagalog". This could be the reason for the decrease mean achievement scores in Science and Pilipino for most of the "Visayan" speaking pupils and the increase in achievement scores in Science and Pilipino for "Tausog"speaking pupils in Sulu.

Policy Implications

From the few studies cited, there appears to be indications in the Philippine situation that the first language of children is a necessary and important ingredient for learning science. It is a fact that the language of science is precise and has specific meanings. The concepts are understood in the same way by those who have to study and learn particular fields or disciplines in science. It is also mainly linguistic in that communication using the processes of inductive form of reasoning is important and necessary for scientists to interpret and understand physical and natural laws of nature. As such the problems of teaching science arise from the points of linguistic and conceptual difficulties. A science teacher must therefore be able to understand and use the language to learn the science concepts and teach these concepts to pupils in a language that the pupils also may understand and use.

The science teacher can only do this if we educate teachers in a language where he comprehends best - his own native language and not in a foreign language. The same will be true for pupils learning science. Let them learn the concepts in a language that they likewise comprehend best. In this case, the language to be used in teaching science is therefore Pilipino.

If implemented, will this restrict Filipino scholars from entry into the scientific comunity? Not the least! Communication in science is said to be accomplished in two ways. One is through the scientific exchange of information among scholars and scientists. In the Philippines, this is only possible at present by the top 10-15% of the highly intellectual educated group. This gifted few could be assisted in the system by providing them with "opportunities" to develop their competence in the English language and develop higher order thinking skills to be able to communicate with other scholars in the scientific field in the world. The other form of communication is dissemination of the uses and application of scientific concepts to the larger base of consumer-target users. In this case, it is the 85% group of people who will have to use and apply the findings of science and technology in their

everyday living. Dissemination of this knowledge is best done in the native language of the target users.

The contribution of Pilipino to the scientific advancement in the Philippines will lie in the "popularization" of scientific knowledge as well as in the development of future Filipino scientists. Not being a mother tongue of practically all except a small fraction of the Filipino population, English is a poor substitute for an indigenous language which can be used by a child in and outside the school environment. The upper 10-15% educated and intellectual group will be able to handle and be competent in the two languages. But the greater bulk of the population will need scientific information that is popularized using the native language. In this native language, mass media, books, periodicals, and other means of communication will have greater utility as carriers of scientific information without the constraints of choice of language. This will also complement teaching in schools making learning more meaningful and experiential for students.

The development and use of Pilipino as an indigenous linguistic tool for science will not happen overnight. One possible thought for seeking a solution to the problem of language change in the Philippine case is

given in the article on Language Engineering by Mohd Gary @ Gary Jones (Borneo Bulletin, October 31 1991) when he suggested that "Each community should be treated as a separate case and language change implementation should be approached with a sympathetic appreciation of how the change will affect recipients". This is certainly a strong base for the argument - science teaching for what and for whom.

TABLE 1

Mean Percentage Scores by Subject Area and by School Division
Academic School Year 1969-1990/1990-1991
Grade IV

Division	Native Language	1* 2*	English	Science	Pilipino
Basilan	Chavacano	1	54.73	53.73	52.67
		2	56.08	48.88	52.62
			+ 2.47	- 9.83	- 0.09
Dapitan	VIsaya	1	69.24	62.76	60.58
		2	58.24	68.64	53.04
			- 15.88	+ 9.37	+12.45
Dipolog	Visaya	1	59.73	49.73	51.67
		2	59.28	57.20	47.84
			- 0.75	+15.02	_ 7.41
Pagadian	Visaya	1	54.13	39.33	47.33
		2	47.84	35.36	40.56
			- 11.62	-10.09	-14.30
Sulu	Tausog	1	43.47	31.07	36.73
		2	44.72	35.36	44.72
			+ 2.88	+13.81	+21.75
Tawi-Tawi	Sama	1	41.55	42.94	38.29
		2	41.60	31.20	40.52
			+ 0.12	-27.34	+ 5.93
Zamboanga	Chavacano	1	58.33	48.60	57.20
		2	64.68	50.21	61.02
			+ 10.89	- 3.31	
Zambo Norte	Visaya	1	56.30	52.93	48.67
		2	63.44	64.48	59.28
			- 12.68	+21.82	+21.80
Zambo Sur	Visaya	1	59.01	48.04	51.30
		2	50.96	46.80	46.80
			- 13.64	- 2.58	+ 8.77
Region IX	TOTAL	1	56.41	48.14	49.94
		2	55.64	51.44	50.39
			- 1.37	+ 6.85	+ 0.90

*1 - 1989-1990 *2 - 1990-1991 +/- increase/decrease

TABLE 2

Mean Percentage Scores by Subject Area and by School Division
Academic School Year 1969-1990/1990-1991
Grade VI

Division	Native Language	1* 2*	English	Science	Pilipino
Basilan	Chavacano	1	65 90	59.78	59.00
		2	65.93	54.38	59.29
			+ 0.05	- 9.83	+ 0.49
Dapitan	VIsaya	1	73.73	72.07	61.13
		2	70.98	69.71	56.32
			- 3.73	+ 3.27	- 7.87
Dipolog	Visaya	1	64.72	60.28	52.67
		2	72.35	65.86	65.63
			+ 11.79	+ 9.25	+24.61
Pagadian	Visaya	1	62.67	52.83	53.65
		2	57.75	51.56	54.44
			- 7.05	- 2.40	- 1.45
Sulu	Tausog	1	40.50	38.22	46.22
		2	51.63	42.55	52.68
			+ 27.48	+10.81	+13.98
Tawi-Tawi	Sama	1	33.48	30.07	36.29
		2	48.83	40.47	44.34
			+ 45.85	+34.59	+22.18
Zamboanga	Chavacano	1	56.05	57.78	59.89
		2	64.18	66.50	59.24
			+ 14.50	+15.09	- 1.09
Zambo Norte	Visaya	1	55.42	52.53	57.19
		2	65.23	63.88	59.59
			+ 17.70	+21.61	+16.41
Zambo Sur	Visaya	1	57.65	52.00	52.90
		2	55.01	51.91	51.55
			- 4.58	- 0.17	- 2.55
Region IX	TOTAL	1	57.11	52.79	52.82
		2	60.06	56.23	54.98
			+ 5.17	+ 6.52	+ 4.09

*1 - 1989-1990 *2 - 1990-1991 +/- increase/decrease

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